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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,573	04/21/2004	Matthew A. Ahrens	03226.390001; P8399	5289
32615	7590	10/16/2008	EXAMINER	
OSHA LIANG L.L.P./SUN TWO HOUSTON CENTER 909 FANNIN, SUITE 3500 HOUSTON, TX 77010			DEBNATH, SUMAN	
			ART UNIT	PAPER NUMBER
			2435	
			NOTIFICATION DATE	DELIVERY MODE
			10/16/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/828,573	AHRENS ET AL.	
	Examiner	Art Unit	
	SUMAN DEBNATH	2435	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 22 August 2008.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1,18 and 25-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1,18 and 25-27 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ . | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

1. Claims 1, 18 and 25-27 are pending in this application.
2. Claims 1, 5, 18, 20 and 25-26 are presently amended.
3. Claims 2-4, 6, 12-17 and 19 are cancelled.

Claim Rejections - 35 USC § 103

4. Claims 1, 5, 7-11, 18 and 20-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talagala et al. (Pub. No.: US 2002/0161972 A1) (hereinafter “Talagala”) and further in view of Sawdon et al. (Patent No.: US 6,829,617 B2) (hereinafter “Sawdon”) and Pearce et al. (Patent No.: US 6,192,471 B1) (hereinafter “Pearce”).
5. As to claim 1, Talagala discloses a method for storing data blocks (abstract), comprising: storing a first data block and a second data block in a storage pool (Talagala teaches this concept by providing parity/stripe group tables having entries for multiple blocks of data stored in a storage pool, -e.g. [0059], FIG. 6C, 7B and 8B); obtaining a first data block location and a second data block location ([0017], [0059]); calculating a first data block checksum for the first data block (Talagala discloses writing blocks having checksum and location in PGT (Parity Group Table) which have “segment” filed to store locations and “checksum” fields to store checksum, -e.g. [0059], FIG. 6C, 7B and 8B); calculating a second data block checksum for the second data block ([0059], FIG. 6C, 7B and 8B); storing a first indirect block at a first indirect block location the storage pool, wherein the first indirect block comprises a first block pointer comprising the first data block location and the first data block checksum and a second block pointer comprises the second data block location and the

second data block checksum (“an indirection map (e.g., block remapping table) matches virtual block address to physical block address. Block-level checksums may be provided in the indirection map” – e.g. [0059] and FIG. 6C; “each valid PGT entry also includes a back pointer to the next entry in a parity group so that the first physical segment in a parity group is linked to the second physical segment in that parity group, and the second physical segment to the third and so on, until the last physical segment contains the parity data for that parity group. The physical segment that contains the parity data is linked back to the first physical segment in the parity group, thereby creating a circular list for that parity group” –e.g. [0056], Applicant should note that a circular linked list will comprise “a first physical segment in a parity group” which comprises a first indirect block referencing the first and second data blocks and so on as claimed by applicant). calculating a first indirect block checksum for the first indirect block by applying a checksum function to the first indirect block ([0059], [0061]); and storing a second indirect block at a second indirect block in the storage pool, wherein the second indirect block comprises the first indirect block location and the first indirect block checksum (Talagala teaches writing a block having a checksum and a location in PGT (Parity Group Table) which have a "segment" field to store a location and a "checksum" field to store a checksum and provides which contain parity/stripe group tables having entries for multiple blocks of data stored in a storage pool, -e.g. [0059] and FIG. 6C, 7B and 8B).

Talagala is silent on wherein data stored in the storage pool is organized as a hierarchical tree, and wherein the first and second data block are stored on a first level of the hierarchical tree; wherein second indirect block location on a third level of the hierarchical tree and wherein each of the first data blocks location, the second data block location, the first indirect block location and the second indirect block location are separate physical locations in the storage pool. However, Sawdon

discloses wherein each of the first data block location, the second data block location, the first indirect block location and the second indirect block location are separate physical locations in the storage pool (FIG. 2B, 8D, 15A, col. 7, lines 9-30, col. 9, lines 13-26, col. 13, lines 52-65 and col. 20, lines 11-31).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the teaching of Talagala as taught by Sawdon in order to "support time sensitive processing tasks such as external data communications processing (Sawdon, col. 2, lines 30-35)."

Neither Talagala nor Sawdon explicitly disclose wherein data stored in the storage pool is organized as a hierarchical tree, and wherein the first and second data block are stored on a first level of the hierarchical tree; wherein second indirect block location on a third level of the hierarchical tree. However, Pearce discloses wherein data stored in the storage pool is organized as a hierarchical tree, and wherein the first and second data block are stored on a first level of the hierarchical tree (FIG. 2C, col. 4, lines 52-67); wherein second indirect block location on a third level of the hierarchical tree (FIG. 2C, col. 4, lines 52-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the teaching of Talagala and Sawdon as taught by Pearce in order to make sure that "the virtual driver appears to a computer user simply as a single file (Pearce, col. 3, lines 15-20)."

6. As to claim 5, Talagala discloses further comprising: storing a birth value in a birth field in the first block pointer ("a hashed indirection table (HIT) which maintains generational images" and

explains that "the PGT index columns are now labeled version zero through version two, where version zero corresponds to the most current version and version two corresponds to the oldest version" –e.g. [0065]).

7. As to claim 7, Talagala discloses wherein the storage pool comprises at least one storage device ("array of storage devices 410" –e.g. FIG. 2 and 3, [0033]).
8. As to claim 8, Talagala discloses wherein the storage pool is divided into a plurality of metaslabs (Talagala teaches having different "stripes of data" within an array storage devices –e.g. [FIG. 4 and [0043] and explains that a "stripe" of data is analogous to a "parity group" –e.g. [0063], lines 10-11, wherein configuration information for each of the "parity groups" is stored in a "PGT (parity group table)" –e.g. FIG. 6C, 7B and 8B, and further explains "the indirection map may also include a parity group pointer for each data block that points to a next member of that parity group" – e.g. [0013], wherein "when a READ or WRITE command is received for a block(s), the appropriate PGT entry is accessed to locate the blocks in the disk drives" –e.g. [0058]. As defined by Applicant, metaslabs are "contiguous regions of data" in which "the storage space in the storage pool is divided" (Specification, [0032]); therefore, Applicant should note that these metaslabs may comprise any amount of contiguous data, such as segments or blocks into which a storage pool is divided, as described by Talagala).
9. As to claim 9, Talagala discloses wherein each of the plurality of metaslabs is associated with a metaslab ID (Talagala teaches this concept as each virtual block has a virtual address which is

used to access a "HIT (Hash Indirection Table)" which contains "PGT (Parity Group Table) indices to access a PGT which contains configuration information for each of the parity groups/metaslabs such as a segment field which indicated the physical disk location (disk and segment) of parity groups. – e.g. FIG. 6B, 6C, 7A, 7B, 8A and 8B, [0055], [0058], [0059]).

10. As to claim 10, Talagala discloses wherein the first data block location comprises the metaslab ID (Talagala teaches this concept as "the indirection map may also include a parity group pointer for each data block that points to a next member of that parity group" –e.g. [0013], wherein "when a READ or WRITE command is received for a block(s), the appropriate PGT entry is accessed to locate the blocks in the disk drives" –e.g. [0058], "HIT (Hash Indirection Table)" and explains having "PGT (Parity Group Table)" indices to access a PGT which contains configuration information for each of the parity groups such as a segment field which indicated the physical disk location (disk and segment) of parity groups –e.g. [0055], [0058], [0059] and FIG. 6B, 6C, 7A, 7B, 8A and 8B). Talagala provides an example in which Virtual address 0 corresponds to PGT index 12, which contains valid data at physical segment D1.132 wherein "this may be interpreted as Disk 1, segment 132" –e.g. [0057] and Figures 6B, 6C, 7A, 7B, 8A and 8B). As defined by Applicant, metaslabs are "contiguous regions of data" in which "the storage space in the storage pool is divided" (Specification, [0032]); Therefore, Applicant should note that these metaslabs may comprise any amount of contiguous data, such as segments or blocks into which a storage pool is divided, as described by Talagala) and an offset (Talagala teaches this concept as entries stored under the "next entry in Parity Group" field in PGT (Parity Group Table) which points to the next virtual block entry, -e.g. [0057] and FIG. 6B, 6C, 7A, 7B, 8A and 8B).

11. As to claim 11, Talagala discloses wherein storing the first data block and the second data block comprises using a storage pool allocator (“Storage Controller 401” –e.g. FIG. 2 and 3, [0033], [0059]).
12. As to claim 18, it is rejected using the same rationale as for the rejection of claim 1.
13. As to claim 20, Talagala discloses further comprising: a data management unit configured to assemble the first indirect block and request the storage pool allocator to store the first indirect block (“Storage Controller 401” –e.g. FIG. 2 and 3, [0033]).
14. As to claim 21, Talagala discloses wherein the storage pool comprises at least one storage device (“array of storage devices 410” –e.g. FIG. 2 and 3, [0033]).
15. As to claim 22, it is rejected using the same rationale as for the rejection of claim 8.
16. As to claim 23, it is rejected using the same rationale as for the rejection of claim 9.
17. As to claim 24, it is rejected using the same rationale as for the rejection of claim 10.
18. As to claims 25, 26 and 27, these are rejected using the same rationale as for the rejection of claim 1.

19. **Examiner's note:** Examiner has cited particular columns and line numbers in the references as applied to the claims above for the convenience of the Applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may be applied as well. It is respectfully requested from the applicant, in preparing the responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

Response to Amendment

20. Applicant has amended claims 1, 18 and 25-27, which necessitated new ground of rejection. Please see rejection above. Applicant's arguments filed August 22, 2008 have been fully considered but they are not persuasive.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "a hierarchical tree") were not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, Pearce teaches a hierarchical tree (FIG. 2C).

Applicant argues that: "Talagala does not teach or suggest calculating a checksum for any blocks other than the data block and parity blocks. Said another way, Talagala fails to teach calculating a checksum for the PGT itself."

Examiner maintains that Talagala teaches writing blocks having checksum and location in PGT (Parity Group Table) which have “segment” filed to store locations and “checksum” fields to store checksum, -e.g. [0059], FIG. 6C, 7B and 8B.

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUMAN DEBNATH whose telephone number is (571)270-1256. The examiner can normally be reached on 8 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Y. Vu can be reached on 571 272-3859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. D./
Examiner, Art Unit 2435
/KimYen Vu/
Supervisory Patent Examiner, Art Unit 2435